

DECLARATION UNDER 37 CFR § 1.132

I, Johannes Schroeter declare and state the following:

1. I am an engineer (Dipl.-Ing.), expert for polymer engineering, professor for polymer engineering at Rosenheim University of Applied Sciences since 1993, have been chairman of the German Biodegradable Polymers Society (IBAW e.V.) from 1993 to 1999. I have done much research in the field of polymers from renewable resources and biodegradable polymers. I am co-author of the publication "Melting cellulose" (Cellulose 12;159-165, 2005 DOI: 10.1007/s10570-004-0344-3) that describes a process to convert pulp fibers to cellulose films by shear, pressure and well tuned laser radiation. A copy of my *curriculum vitae* is attached as Attachment A, a copy of the above article is attached as Attachment B.

2. I have read US Patent Application No. 10/539,775 to Johannes Schroeter et al., ("the application") and the claims pending as of September 1, 2009.

3. I also have read the office action dated September 1, 2009 and the following references that were cited by the examiner in that office action: (a) U.S. Patent No. 6,478,494 ("Eckl") and (b) U.S. Patent No. 5,780,524 ("Olsen").

4. Eckl is concerned with a process for making a rod shaped product that has a core surrounded by a polymer that has been plasticized and extruded. It describes using at least one natural polymer and a sliding agent comprising a native oil (column 2, lines 23-55). Either oils or waxes are mixed with the polymer (columns 4 line 61). In plastics engineering, this procedure is mainly done by compounding. In Claim 1b (Column 5, lines 3-5), Eckl himself describes the compounding process. Those waxes and oils which Eckl denotes as 'sliding agents' (columns 3, lines 52-53) are generally denominated as 'plasticisers' in the field of polymer engineering. The oil is said to improve "the physical properties of the natural polymer, e.g. reduces the melting temperature, increases shapeability, increases the elastic properties, reduces brittleness and optionally increases adhesion" (Column 2, lines 52-55). I interpret Eckl as teaching a way to melt a polymer at reduced temperatures by reducing the melting temperatures of a polymer by oils or waxes that act as plasticisers. It is well known that plasticizers reduce the melting temperature (exactly: plastification temperature, as many polymers don't have a crystalline phase so that no phase transition from crystalline to liquid can occur, what is originally meant by the word melting). Plasticisers are also appropriate to

improve the other physical properties mentioned in the quote above (increase shapeability, increase the elastic properties, reduce brittleness).

5. Olsen teaches using a laser to heat treat synthetic fibers. More than 100 times he uses the word heat/ heater/ microheater/ heating which means to make the molecules oscillate. It states that "the present invention provides a non-contact quantum mechanical heating process utilizing selective resonance energy heating technology. In this regard, infrared (IR) or visible/ultraviolet (UV) wavelength energy is utilized for the heating source. The thermoplastic fiber is excited to a higher energy state by absorption of laser energy of a resonance wavelength. This energy is eventually dissipated so the fiber (a molecular polymer) can relax to the stable ground state" (column 4 and 5). Also, claim 1, part d) of Olsen recites "to continuously heat the fiber by resonant energy absorption of the laser beam."

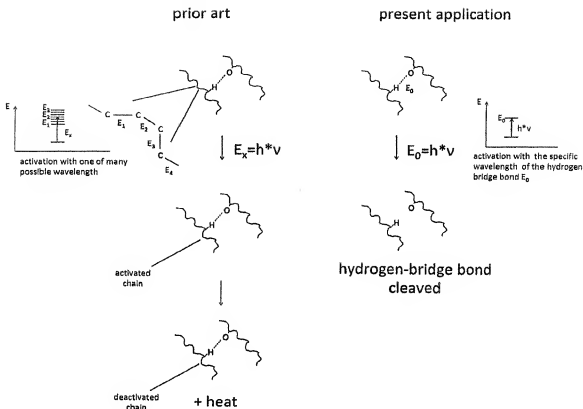
6. It is my opinion that both Eckl and Olsen teach using heat to melt a polymer. Eckl teaches using thermal heat to extrude the polymer. Olsen teaches using laser radiation to heat a polymer fiber.

7. It is also my opinion that although Olsen uses lasers to treat polymers, Olsen is teaching something that is quite different from what is described in the application. In Olsen's process laser light is absorbed by intramolecular bonds of the polymer molecule. The polymer is transferred to an "excited" state. It relaxes, creating heat. Thus, the laser light energy is transformed to heat energy. Olsen himself explains that in the case of IR absorption, 'the energy converts one hundred percent to classical heat within the cell, thus, evenly heating fibers for conventional machine processes' (column 3, lines 30-33). In contrast, in the process of the invention described in the application, the IR energy firstly converts to opened bonds when a polymer is treated with laser light of a wavelength that selectively interacts with the bond energy of the intermolecular bonds of the polymer. These secondary valency bonds, which hold different polymer molecules together (i.e. hydrogen bridge bonds) are cleaved by absorption of the electromagnetic radiation of this specific wavelength. . Then, plastic deformation occurs. After the plastic deformation, the bonds will recombine, releasing the remaining parts of the initial IR energy. Thus, according to the present invention the energy does not 'evenly heat fibers for conventional machine process', as it does in Olsen's process (Olsen, column 3, lines 30-33) .

This is only possible, if the laser light has exactly the energy (i.e. the wavelength) which corresponds to the bond energy of the secondary valency bond, additionally taking into account modifications of the bond energy by mechanical stress from pressure and shear. There is no dissipation of energy to create heat but the energy

causes the non-thermic cleavage of hydrogen bridge bonds. This is described in the application at pages 7-9. As described in CELLULOSE 12: 159-165, this non-thermal process even works if the polymer is embedded as a thin layer (20 μm) between cold steel rods, which underlines that no heating is required. The difference between Olsen and the present invention can be compared to the difference between sunburn (actinocutitis) and skin damage caused by hot water or fire.

8. The following schematic explains the difference between what Olsen teaches and what is occurring according to the invention described in the application.



9. It is my opinion that because of the significant differences between what Olsen is teaching and what is being done according to the application, one of skill in the art at the time of the invention could not have arrived at the invention claimed in the application by combining Eckl with Olsen.

10. I declare further that all statements made herein of his own knowledge are true and that all statements made on information and belief are believed to be true; further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the Application or any patent issuing thereon.

DATE: 30/11/2009

Name
Attachment A

Curriculum Vitae

14.03.1959	born in Gelsenkirchen, Germany
1965 - 1969	Elementary School in Gelsenkirchen
1969 - 1977	Secondary School (Gymnasium) in Gelsenkirchen
1977	Final secondary school examinations (Abitur)
1977 - 1979	Compulsory civilian service
1979 - 1985	Studies in Mechanical Engineering, with emphasis on material engineering
1985	Received engineering diploma (Dipl.-Ing.)
1985 - 1993	With Buck-Werke GmbH, Bad Reichenhall, Germany; responsible for the establishment of a materials research group; research on biodegradable polymers, polymers made from renewable resources, and polymer behavior at high deformation rates
1991	Graduation to Doctor of Engineering (Dr.-Ing.); doctoral thesis about the properties of polymers at high velocity impact
Since 1993	Professor for Polymer Processing and Testing, at Rosenheim University of Applied Sciences (Germany)
Since 2003	Dean of the Engineering Faculty